

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference 030226WO	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/US04/15204	International filing date (day/month/year) 14 May 2004 (14.05.2004)	Priority date (day/month/year) 14 May 2003 (14.05.2003)	
International Patent Classification (IPC) or national classification and IPC IPC: H04J 11/00 USPC: 370/210			
Applicant QUALCOMM INCORPORATED			

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

a. ☐ (sent to the applicant and to the International Bureau) a total of ___ sheets, as follows:

☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) ___, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒ Box No. I Basis of the report

☐ Box No. II Priority

☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

☐ Box No. IV Lack of unity of invention

☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

☐ Box No. VI Certain documents cited

☐ Box No. VII Certain defects in the international application

☐ Box No. VIII Certain observations on the international application

Date of submission of the demand

15 November 2004 (15.11.2004)

Date of completion of this report

19 April 2006 (19.04.2006)

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/US04/15204

Box No. I Basis of the report

1. With regard to the **language**, this report is based on:

- ☒ the international application in the language in which it was filed.
- ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4(a))
 - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

- ☒ the international application as originally filed/furnished
- ☒ the description:
- pages 1-22 as originally filed/furnished
- pages* NONE received by this Authority on _____
- pages* NONE received by this Authority on _____
- ☒ the claims:
- pages 23-25 as originally filed/furnished
- pages* NONE as amended (together with any statement) under Article 19
- pages* NONE received by this Authority on _____
- pages* NONE received by this Authority on _____
- ☒ the drawings:
- pages 1-6 as originally filed/furnished
- pages* NONE received by this Authority on _____
- pages* NONE received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/US04/15204

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims <u>2-7, 9-14, 16-19</u>	YES
	Claims <u>1, 8, 15, 20</u>	NO
Inventive Step (IS)	Claims <u>10-11</u>	YES
	Claims <u>1-9, 12-20</u>	NO
Industrial Applicability (IA)	Claims <u>1-20</u>	YES
	Claims <u>NONE</u>	NO

2. Citations and Explanations (Rule 70.7)

Please See Continuation Sheet

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

Claims 1, 8, 15, and 20 lack novelty under PCT Article 33(2) as being anticipated by Taylor et al (US 2003/0039317 A1).
Regarding claims 1, 8, 15, and 20, Taylor discloses a method and apparatus for estimating noise in an Orthogonal Frequency Division Multiplexing (OFDM) system, the method comprising: receiving OFDM symbols; and detecting a received power of a signal in an unassigned sub-carrier frequency band (see paragraph 0025).

Claims 2, 3, 6, 16-17, and 19 lack an inventive step under PCT Article 33(3) as being obvious over Taylor in view of Magee et al (US 6,563,885 B1).

Regarding claims 2, 6, 16-17, Taylor does not specifically disclose averaging the received power with at least one previously stored received power measurement for the unassigned sub-carrier frequency band. However, Magee teaches the averaging (see col. 8, lines 47-52). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to average the received power as taught by Magee in the system of Taylor in order to smooth the noise estimates.

Regarding claims 3 and 19, Taylor does not specifically disclose demodulating prior to detecting. However, Magee discloses this feature (see 22 and 32 of figure 1 and col. 4, lines 28-34). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to demodulating prior to detecting as taught by Magee in the system of Taylor in order to meet specific needs.

Claims 12-13 lack an inventive step under PCT Article 33(3) as being obvious over the prior art as applied in the immediately preceding paragraph and further in view of Walton et al (US 2003/0081538 A1).

Regarding claims 12-13, Taylor in view of Magee does not specifically disclose communicating the noise estimate to a transmitter.

Supplemental Box

However, Walton discloses this limitation (see paragraph 0096). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to communicate the noise estimate to a transmitter as taught by Walton in the system of Taylor in order to adjust power to minimize interference.

Claim 4 lacks an inventive step under PCT Article 33(3) as being obvious over Taylor in view of Rauschmayer (US 2003/0087651 A1).

Regarding claim 4, Taylor does not specifically disclose determining the unassigned sub-carrier frequency band based in part on a received message. However, Rauschmayer teaches this limitation (see control or training message in paragraph 0024). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the received message as taught by Rauschmayer in the system of Taylor in order to determine the carrier frequency availability.

Claim 5 lacks an inventive step under PCT Article 33(3) as being obvious over Taylor in view of Chen et al (US 2002/019677 A1). Regarding claim 5, Taylor does not specifically disclose determining the unassigned sub-carrier frequency band based in part on an internally generated sequence. However, Chen discloses this limitation (see hopping sequence in paragraph 0028). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the hopping sequence as taught by Chen in the system of Taylor in order to determine the carrier frequency availability.

Claims 7 and 18 lack an inventive step under PCT Article 33(3) as being obvious over Taylor in view of Lee et al (US 2003/0058953 A1).

Regarding claims 7 and 18, Taylor does not specifically disclose converting, removing, and transforming. However, Lee discloses this limitation (see figure 2). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to convert, remove, and transform as taught by Lee in the system of Taylor in order to process the received signal.

Claim 9 lacks an inventive step under PCT Article 33(3) as being obvious over Taylor in view of Beadle et al (US 2003/0072392 A1).

Regarding claim 9, Taylor does not specifically disclose determining a sum of a square of a quadrature signal component with a square of an in-phase signal component. However, Beadle discloses this limitation (see paragraph 0008). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to determining as taught by Beadle in the system of Taylor in order to meet specific needs.

Claim 14 lacks an inventive step under PCT Article 33(3) as being obvious over Taylor in view of Magee and Rauschmayer.

Regarding claim 14, Taylor discloses a method of estimating noise in OFDM system comprising receiving and determining a power of a signal in a frequency band corresponding to an unassigned sub-carrier (see paragraph 0025). Taylor does not specifically disclose determining an unassigned sub-carrier and averaging the power of the signal. However, Magee teach the averaging (see col. 8, lines 47-52) and Rauschmayer teaches determining an unassigned sub-carrier (see control or training message in paragraph 0024). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to averaging the power and determining the unassigned sub-carrier as taught by Magee and Rauschmayer in the system of Taylor in order to meet the design criteria of a particular implementation.

Claims 10-11 meet the criteria set out in PCT 33(2)-(3), because the prior art does not teach or fairly suggest determining if the unassigned sub-carrier frequency band comprises a system wide unassigned sub-carrier frequency band; storing the detected received power as a noise plus interference estimate if the sub-carrier frequency band does not comprises the system wide unassigned frequency band; and storing the detected received power as a noise floor estimate if the sub-carrier frequency band comprises the system wide unassigned frequency band.